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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/954,806	09/18/2001	Hiroyuki Akashi	09792909-5185	8207

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EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 01/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/954,806	AKASHI ET AL.
	Examiner	Art Unit
	Raymond Alejandro	1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *08/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

In response to the amendment filed on 08/22/03, please note the following: the objection to the abstract has been overcome, however, the 35 USC 102/103 rejection is herein maintained for the reasons of record. Thus, the instant claims (including newly added claims 8-12) are finally rejected.

Specification

1. The amendment filed 08/22/03 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. *The added material which is not supported by the original disclosure is as follows: "wherein the open circuit voltage is from 0V to 4.2 V", in particular, the circuit voltage from 0V to 2.74V, inclusive. It is noted that the specification discloses that "lithium ion secondary battery can be considered as the complete discharge state at the point where the closed circuit voltage reaches 2.75 V" (refer to page 17, lines 2-6, and page 30, last paragraph to page 31, continued paragraph). Thus, the original disclosure appears to not provide support for the foregoing claim language.*

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. *The added material which is not supported by the original disclosure is as follows: "wherein the open circuit voltage is from 0V to 4.2 V", in particular, the circuit voltage from 0V to 2.74V, inclusive. It is noted that the specification discloses that "lithium ion secondary battery can be considered as the complete discharge state at the point where the closed circuit voltage reaches 2.75 V" (refer to page 17, lines 2-6, and page 30, last paragraph to page 31, continued paragraph). Thus, the original disclosure appears to not provide support for the foregoing claim language.*

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the EP 997960 reference.

The instant claims are directed to a secondary battery wherein the disclosed inventive concept comprises the specific ratio of the electrode layer thickness. Other limitations include the specific thickness range; the negative electrode material; the light metal and the particular electrolyte.

As to claims 1-2 and 10:

The EP'960 reference teaches a non-aqueous electrolyte secondary battery comprising an electrode group (2) including a positive electrode (12), a negative electrode (13) including a material for absorbing-desorbing lithium, and a separator (3), a non-aqueous electrolyte impregnated in the electrode group and including a non-aqueous solvent and a lithium salt (electrolyte) dissolved in the solvent (ABSTRACT/section 0008).

As to the limitation that the positive electrode includes a positive electrode mixture layer *capable of occluding and releasing light metal*, the EP'960 reference teaches that the positive electrode active material are various oxides such as lithium manganese composite oxide, lithium-containing nickel oxide, lithium-containing cobalt oxide, lithium-containing nickel cobalt oxide, lithium containing iron oxide, and lithium containing cobalt oxide, of these materials, lithium containing cobalt oxide $LiCoO_2$, lithium containing nickel cobalt oxide $LiNi_{0.8}Co_{0.2}O_2$, and lithium manganese composite oxide $LiMn_2O_4$ are preferably (section 0019). Although the instant claims do not recite the particular composition of the positive electrode, it is noted that the positive electrode active materials of the prior art has identical product compositions as the positive electrode active material disclosed by the applicant ***(see applicants' specification,***

application 09/954806, page 6, line 24 to page 7, line 12). Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property i.e. capable of occluding and releasing light metal, is necessarily present in the prior art active material.

Figure 4 shows the thickness of a positive electrode active material layer wherein P represents the electrode layer (section 0119).

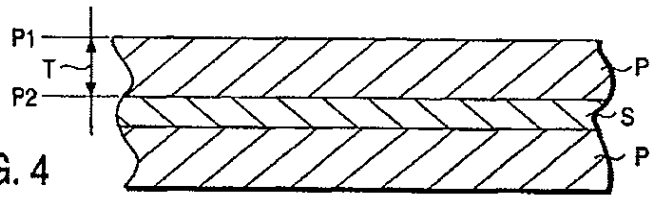

FIG. 4

It is also disclosed that the positive electrode has a structure in which an electrode layer containing an active material is carried by one or both surfaces of the collector (section 0018). It is also disclosed that the negative electrode has a structure in which an electrode layer containing an active material is carried by one or both surfaces of the collector (section 0026)

The EP'960 reference teaches that the thickness of the positive electrode layer should be 10-100 μm; it follows that where positive electrode layers are formed on both surfaces of the collector, one positive electrode layer has a thickness of 10-100 μm, naturally, the total thickness of the two positive electrode layers formed on both surfaces of the collector is 20-200 μm. It is also disclosed that **the upper limit in the thickness is preferably 85 μm**. (section 0119/ 0158). *Hence, the EP'960 reference anticipates the claimed thickness, at least, from 80 to 100 μm when one layer is formed, and at least, from 80 to 200 μm when two layers are formed thereon.*

The EP'960 reference teaches that the thickness of the negative electrode layer should be 10-100 μm; it follows that where negative electrode layers are formed on both surfaces of the

collector, one negative electrode layer has a thickness of 10-100 μm, naturally, the total thickness of the two negative electrode layers formed on both surfaces of the collector is 20-200 μm. It is also disclosed that **the upper limit in the thickness is preferably 85 μm**. (section 0125/ 0161). *Hence, the EP'960 reference anticipates the claimed thickness, at least, from 80 to 100 μm when one layer is formed, and at least, from 80 to 200 μm when two layers are formed thereon.*

Table 6 below shows specific examples as follows:

Table 6

	Capacity (Ah)	Thickness of one layer of positive electrode (μm)	Thickness of one layer of negative electrode (μm)
Example 37	0.38	80	80
Example A	0.35	87	90
Example B	0.05	8	8
Comparative example 12	0.30	105	108

It is apparent from Table 6 that Examples "37", "A" and "12" comprise positive and negative electrode layers having a thickness of:

a) **80 μm** both electrode layers (Example 37);

b) **87 μm** the positive electrode layer and **90 μm** the negative electrode layer (Example A);

c) **105 μm** the positive electrode and **108 μm** the negative electrode (Comparative Example 12).

Thus, specific examples falling within the claimed range are disclosed. Hence, the foregoing Examples are more than sufficient specificity. (***MPEP 2131.03 Anticipation of Ranges***).

As a result the ratio (A/B) of the thickness of the positive electrode mixture layer and thickness B of the negative electrode mixture layer is as follows:

for a) the ratio (A/B) is **1.0** [Example 37];

for b) the ratio (A/B) is **0.967** [Example A];

for c) the ratio (A/B) is **0.972** [Comparative Example 12].

Thus, the battery of the EP'960 meets the specific ratio (A/B) requirement as the foregoing examples exhibit ratio (A/B) of 0.92 or more.

As to the limitation that the capacity of the negative electrode is expressed by the sum of a capacity component by occluding and releasing light metal and a capacity component by precipitating and dissolving light metal, since applicants disclose:

a) that during the process of charging, lithium metal starts to precipitate in the negative electrode at the point where the open circuit voltage (battery voltage) is lower than the overcharge voltage. In other words, the capacity of the negative electrode is expressed by the sum of the capacity component of occluding/releasing lithium and the capacity component of precipitating /dissolving lithium metal. The overcharge voltage means an open circuit voltage when the battery is overcharged, and indicates the voltage higher than the open circuit voltage of the full charged battery ***(see applicants' specification, application 09/954806, page 14, lines 13-24),***

b) the ratio of the thickness (A/B) varies depending on the capacities of the positive electrode mixture layer and the negative electrode mixture layer. If the ratio (A/B) is equal to or more than 0.92, lithium metal can be stably precipitated in the negative electrode in the state where the open circuit voltage is lower than the overcharge voltage, and a high energy density and an excellent cycle characteristic can be obtained ***(see applicants' specification, application 09/954806, page 15, lines 9-23),***

*Thus, it asserted that having shown the battery of the prior art does meet such ratio (A/B) requirement (i.e. the ratio (A/B) of the thickness A of the positive electrode mixture layer and thickness B of the negative electrode mixture layer is 0.92 or more), the above-mentioned battery characteristic and/or function is thus inherent as the battery structure recited in the reference is substantially identical to that of the instant claims, and therefore, claimed properties or functions are presumed to be inherent (**MPEP 2112. Requirements of Rejection Based on Inherency**). Thus, the prior art battery seems to be identical except that the prior art is silent as to an inherent function, property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in the battery described in the reference, and that it would be so recognized by persons of ordinary skill.*

As to claims 3-4:

It is disclosed that the negative electrode layer containing an active material is made from carbon material which absorbs lithium. Examples of this carbon material are a graphitized material and carbonaceous material such as graphite (section 0027).

As to claim 5:

The EP'960 reference teaches that the positive electrode active material are various oxides such as lithium manganese composite oxide, lithium-containing nickel oxide, lithium-containing cobalt oxide, lithium-containing nickel cobalt oxide, lithium containing iron oxide, and lithium containing cobalt oxide, of these materials, lithium containing cobalt oxide $LiCoO_2$,

lithium containing nickel cobalt oxide $LiNi_{0.8}Co_{0.2}O_2$, and lithium manganese composite oxide $LiMn_2O_4$ are preferably (section 0019). *Thus, the light metal includes lithium.*

As to claim 6-7:

The EP'960 reference teaches that examples of the electrolytic salt contained in the non-aqueous electrolyte are lithium salts such as $LiPF_6$ which is also most preferred (sections 0051). It is disclosed that the amount of the electrolytic salt dissolved in the non-aqueous solvent should desirably be 0.5 to 2.0 mol/l (section 0052). *Comparative Examples 4 and 6* shows that $LiPF_6$ was dissolved in a mixed solvent in an amount of 1mol/L and 0.8mol/L, respectively (sections 0214 and 0216/Table 2). It is noted that the non-aqueous solvent is unspecified for purposes of determining its mass of substance per unit volume (density). Thus, the specific example in the prior art is understood to be within the claimed range absent that no specific nonaqueous electrolyte solvent is claimed.

On the matter of claims 8-9:

EXAMPLE 36, EXAMPLE 37 and EXAMPLE A in TABLE 6 shows the following thickness of layers of positive and negative electrodes: 60 μm and 65 μm, respectively and thus the A/B ratio is 0.923 (SEE EXAMPLE 36-TABLE 6), and 87 μm and 90 μm, respectively and thus the A/B ratio is 0.966 (SEE EXAMPLE A-TABLE 6).

Regarding claim 11:

The EP'960 reference teaches a voltage ranging from 2.7-4.2 V (SECTION 0205-0206).

As to claim 12:

The use of lithium composite oxide is also taught (for example, in sections 0019/ 0196)

Therefore, the claims are anticipated by the EP'960 reference. However, if the claims are not anticipated the claims are obvious as it has been held products claimed in terms of its function, property and/or characteristic are also obvious. *In re Best 195 USPQ 430 and In re Fitzgerald 205 USPQ 594. See rationale and/or technical reason above to reasonably support the determination that the inherent function and/or characteristic necessarily flows from the teaching of the applied prior art.*

Response to Arguments

Applicant's arguments filed 08/22/03 have been fully considered but they are not persuasive. The assertion that the prior art of record failed to reveal "the capacity of the negative electrode is expressed by the sum of a capacity component by occluding and releasing light metal and a capacity component by precipitating and dissolving light metal, and means for stably precipitating such metal" is not sufficient to overcome the art rejection. In this respect and as previously mentioned, since applicants disclose that: ***a)*** during the process of charging, lithium metal starts to precipitate in the negative electrode at the point where the open circuit voltage (battery voltage) is lower than the overcharge voltage. In other words, the capacity of the negative electrode is expressed by the sum of the capacity component of occluding/releasing lithium and the capacity component of precipitating /dissolving lithium metal. The overcharge voltage means an open circuit voltage when the battery is overcharged, and indicates the voltage higher than the open circuit voltage of the full charged battery **(see applicants' specification, application 09/954806, page 14, lines 13-24)**; ***b)*** the ratio of the thickness (A/B) varies

depending on the capacities of the positive electrode mixture layer and the negative electrode mixture layer. If the ratio (A/B) is equal to or more than 0.92, lithium metal can be stably precipitated in the negative electrode in the state where the open circuit voltage is lower than the overcharge voltage, and a high energy density and an excellent cycle characteristic can be obtained **(see applicants' specification, application 09/954806, page 15, lines 9-23)**, Thus, it asserted that having shown the battery of the prior art does meet such ratio (A/B) requirement (i.e. the ratio (A/B) of the thickness A of the positive electrode mixture layer and thickness B of the negative electrode mixture layer is 0.92 or more), the above-mentioned battery characteristic and/or function is thus inherent as the battery structure recited in the reference is substantially identical to that of the instant claims, and therefore, claimed properties or functions are presumed to be inherent **(MPEP 2112. Requirements of Rejection Based on Inherency)**. Thus, the prior art battery seems to be identical except that the prior art is silent as to an inherent function, property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in the battery described in the reference, and that it would be so recognized by persons of ordinary skill. Moreover, any battery having the specific ratio (A/B) of thickness A of the positive electrode mixture layer and thickness B of the negative electrode mixture layer will thus exhibit the particular negative electrode capacity and will also have the claimed means for stably precipitating the light metals as the same dimensioned electrode mixture layer will feature the stably precipitating condition.

As to the experiments performed by the applicants as shown in TABLE 1, it is contended that a 102-inherency rejection cannot be overcome by presenting the achievement of unexpected results. On the other hand, it is further asserted that the specific experiments shown in TABLE 1

are not commensurate to the presently claimed secondary battery because, for instance, the secondary battery of claim 1 does not recite the specified material s, compositions, molar fractions, structure and the likes of the exemplified prototype. Thus, the examples presented in TABLE 1 do not correspond in terms of substance or constitution to the claimed subject matter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP 1700